REMARKS

The application has been carefully reviewed in light of the Office Action dated February 13, 2004 (Paper No. 23). Claims 1 to 29, 32 to 60 and 63 to 91 are in the application, of which Claims 1, 32 and 63 are independent. Reconsideration and further examination are respectfully requested.

Claims 1 to 5, 7 to 12, 14 to 19, 21 to 26, 28, 29, 33 to 36, 38 to 43, 45 to 50, 52 to 57, 59, 60, 64 to 67, 69 to 74, 76 to 81, 83 to 88, 90 and 91 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,636,338 (Moreton). Claims 6, 13, 20, 27, 37, 44, 51, 58, 68, 75, 82 and 89 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Moreton further in view of U.S. Patent No. 6,268,871 (Rice). Reconsideration and withdrawal of this rejection are respectfully requested.

The present invention concerns orientating a space curve defined by digital data corresponding to an image. The space curve has two endpoints and is adapted to have one of two directions, either a forward direction proceeding along the space curve from an initial endpoint to a terminating endpoint or a reverse direction proceeding along the space curve from the terminating endpoint to the initial endpoint. A desired direction is selected and a first vector is generated having a direction which is the same as the desired direction. A second vector is generated having a corresponding direction derived from a corresponding characteristic of the space curve. A direction of the space curve is determined based on a comparison of the first and second vectors. The determined direction of the space curve is one of two directions, either the forward or reverse direction, that is closest in direction to the desired direction. The space curve is then oriented to the determined direction.

Referring specifically to the claims, amended independent Claim 1 describes a method of orientating a space curve. The method comprises a step of receiving the space curve, wherein the space curve has two endpoints and is adapted to have one of two directions, either a forward direction proceeding along the space curve from an initial endpoint to a terminating endpoint or a reverse direction proceeding along a space curve from the terminating endpoint to the initial endpoint. The method selects a desired direction and generates a first vector having a direction which is the same as the selected desired direction. The method generates at least one second vector, each second vector having a corresponding direction representative of and derived from a corresponding characteristic of the space curve. The method compares the first and second vectors and determines, based on the comparison, a direction of the space curve, wherein the determined direction of the space curve is one of two directions, either the forward or reverse direction, that is closest in direction to the selected desired direction. The method orientates the direction of the space curve to the determined direction.

Applicants submit that the method of Moreton is unrelated to orientation of space curves, and instead relates to an entirely different issue. As a consequence, the method of Claim 1 would not have been obvious to a person having ordinary skill in the art in light of Moreton, as explained below.

Moreton describes methods for forming computer models of curves, networks or surfaces from user-defined specifications of the shape to be modeled (Abstract). The method of Moreton thus starts from a set of user-supplied constraints. Moreton then describes optimization criteria that may be used to obtain a curve satisfying the constraints. A descent scheme is described that starts with an initial curve and iteratively refines that curve until the optimal curve is achieved (col. 11, lines 10 to 12).

Thus, given a set of constraints as an input, Moreton describes how a curve or surface may be calculated as an output.

The method of Claim 1 has a space curve as an input, i.e., the starting point of the method of Claim 1 is a space curve whereas this is the endpoint of Moreton. Given a desired direction, the method of Claim 1 makes a binary decision. The determining step determines which of two directions is closest to the desired direction. The decision is binary in that a forward direction or a reverse direction is chosen. Moreton does not disclose or suggest such a binary choice between two options.

The first step of Claim 1 is "receiving the space curve, ...". The Office Action states that Moreton discloses providing the space curve at col. 5, lines 40 to 51. However, the cited passage of Moreton instead describes how Moreton receives an input specification of a desired shape. Moreton then performs a functional minimization on the specification, to finally produce a representation of the desired shape. Applicants submit that generating a shape from an initial constraint specification is different from receiving a space curve as specified in Claim 1.

Claim 1 specifies that the space curve has one of two directions, either a forward direction proceeding along the space curve from an initial endpoint to a terminating endpoint or a reverse direction proceeding along the space curve from the terminating endpoint to the initial endpoint. The Office Action states that this feature is disclosed by Moreton at col. 8, lines 25 to 45. Applicants have carefully reviewed the cited passage, and can find no reference to a curve having a forward direction along the curve or a reverse direction along the curve. Applicants note that the cited passage includes the phrase "the scalar m_i must be constrained to be positive because if m_i were allowed to

become negative, then P_i' would reverse direction". Applicants note that this does not disclose or suggest a forward and reverse direction along the curve. Instead, P_i' is the first derivative of the curve. A changing sign of the first derivative of the curve is unrelated to the forward direction along the curve and reverse direction along the curve as set out in Claim 1.

Applicants submit that Moreton neither discloses nor suggests the step of "determining, based on a result of said comparing step, a direction of the space curve, wherein the determined direction of the space curve is one of two directions, either the forward or the reverse direction, that is closest in direction to the selected desired direction" (emphasis added). As discussed above, there is no disclosure of such forward and reverse directions by Moreton, nor is there any disclosure or suggestion of determining a direction of the space curve wherein the determined direction is a binary choice between a forward and a reverse direction.

With regard to the determining step, the Office Action cites three passages of Moreton, i.e., column 8, lines 60 to 65, column 9, lines 3 to 11, and column 11, lines 23 to 25.

Column 8, lines 61 to 64, state that "by distributing the curve/element specification in this way, adjacent elements share vertex structures and are guaranteed to meet with the required continuity: tangent, curvature and/or torsion continuity". There is nothing in the cited passage to suggest a determined direction that is either the forward or the reverse direction, that is closest to the selected desired direction.

Column 9, lines 3 to 11, states that:

"Because of the limited descriptive power of polynomial

elements, a single element can only approximate the ideal minimum variation curve. To improve the approximation, multiple elements can be inserted between constraints. In practice, a single element per constraint pair is normally sufficient. Depending on the goal of the application, it may not be important that the theoretical curve is accurately approximated, only that its desirable curvature properties be present."

The cited passage in column 9 describes how a plurality of segments or elements may be placed between two sets of constraints. The passage is entirely silent on determining a direction of the space curve, wherein the determined direction of the space curve is one of two directions, either the forward or the reverse direction, that is closest in direction to the selected desired direction.

Column 11, lines 23 to 25, states that "[B]ased on an understanding of the nature of the MVC functional, an initial curve space that is close to the solution is chosen". The cited passage does not disclose or suggest the determining step as specified in Claim 1.

In view of the foregoing, Applicant submits that Moreton does not disclose or suggest all the elements of Claim 1. The method of Moreton relates to a different problem in designing curve shapes and it is submitted that the method of Claim 1 would not have been obvious to a person having ordinary skill in the art in light of Moreton. Rice is not seen to remedy the deficiencies of Moreton.

With regard to amended independent Claims 32 and 63, Applicants submit that the foregoing discussion with regard to amended independent Claim 1 applies equally to amended Claims 32 and 63.

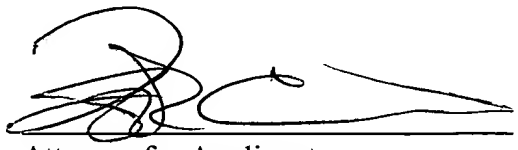
In view of the foregoing deficiencies of the applied art, amended independent Claims 1, 32 and 63 are believed to be allowable.

The other pending claims in this application are each dependent from the independent claims discussed above and are therefore believed patentable for the same reasons. Because each dependent claim is also deemed to define an additional aspect of the invention, however, individual consideration of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, the entire application is believed to be in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

Applicant's undersigned attorney may be reached in our Costa Mesa, CA office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,



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